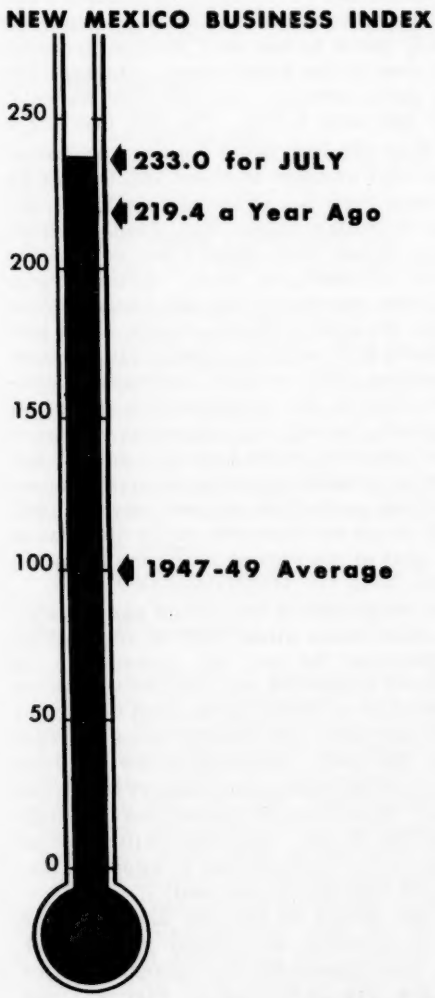
SEPTEMBER 1957

New Mexico BUSINESS



A counter-seasonal decline in business during July dropped the Index of Activity in New Mexico 5 per cent below its June figure; but, despite this slide, the Index showed a 6 per cent gain over a year earlier. The principal offender was the retail group whose sales fell nearly 12 per cent below those of the previous month.

The decline in retail sales also ran counter to their typical seasonal pattern for July and repeated the unusual performance of 1956, which was the first time, according to the Bureau's records, that July's retail volume failed to exceed that of the preceding June.

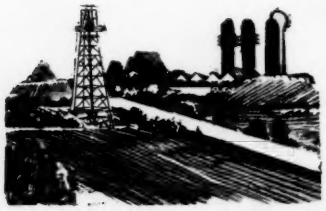
All major retail groups except building material dealers were caught in the July downturn. Furniture and appliance stores were hit hardest, but automotive dealers just about held to their June level and chalked up a fat increase over the disappointing performance of July 1956.

Sales of the public utilities and carriers reflected the deterioration in business conditions in July, as did the sales of service establishments, but both groups made good gains over their July 1956 performance. Manufacturers and processors were not so fortunate. Declining business in July brought

(Continued on Page 9)

A Report on San Juan Oil and Gas

Oil and Gas, Three-Letter Words for Progress in New Mexico's San Juan Basin



By **Arthur A. Blumenfeld**

Among the buttes and the hogbacks, the high mesas and the rolling plateaus of northwestern New Mexico men still find bonanzas. Not pockets of gold nuggets or rich silver-bearing orebodies. Not in streambeds or the rimrock. Nevertheless, strikes to stir the imagination and make the headlines.

It is "black gold" that men are finding these days in the San Juan Basin, and natural gas--that airy, lighthearted fuel which, because there was no market, was for so long considered only a waste product of the earth's creation. Originating in the remote dawn of geologic time, petroleum and natural gas give us indispensable products and services, ranging from the lowly kerosene--which still lights (if not the Lamps of China) many a rural home and many a hunter's or fisherman's camp--to fuel for the jet planes, which constantly splinter the sound barrier and invade once sacrosanct realms of the cosmos. The San Juan oil and gas "boom" might be said to be heard in Outer Space, if there are ears there to hear.

I. Background

The San Juan Basin is an immense geological saucer--one of three in the famed Four Corners country of New Mexico, Arizona, Colorado, and Utah. The portion in New Mexico--approximately 12,000 square miles--includes all of San Juan county and parts of Rio Arriba, McKinley, Sandoval, and Valencia counties. From those 12,000 square miles is coming an increasing yield of gas and oil, which--though still playing second fiddle to production in the southeastern Permian Basin--contributes materially to the state's total production and reserves, both of which are important nationally.

In 1956 New Mexico ranked seventh in the nation both in oil production and in recoverable reserves, accounting for 3.4 per cent of production and 3 per cent of crude reserves. In natural gas the state's position is more significant. In 1956 she stood fourth in production, with 6 per cent of all gas produced, and third in reserves, with 10 per cent of the total.

The relationship between total state production and San Juan production is shown in Tables I and II. During the last few years, San Juan crude oil output finally grew to and still hovers around a mere 1 per cent of the state's total. During 1956 the state's daily average was 242,400 barrels; San Juan's was only 3,000. For the last three years San Juan gas has made a more substantial showing: a daily average of about 466,900 MCFs (thousand cubic feet) out of the state's 1,481,600 MCFs. As to dollar value, San Juan products in 1956 were worth only about 7 per cent of the New Mexico oil-and-gas total. Using prices estimated from reports of the Oil Conservation Commission, we find that San Juan's yield that year was worth $19 million. Obviously, despite new discoveries and steadily increasing production, the role of the northwestern basin, as suggested above, is still supplemental to that of New Mexico's portion of the Permian Basin. But the San Juan is steadily growing in significance. The value of its production tripled between 1953 and 1956. It is not so much the status quo that is impressive as it is the rate at which the situation is changing.

A grasp of the growth of the oil and gas industry in the San Juan Basin since 1953 is afforded by Table I. Between '53 and '56, production of crude increased almost 55 per cent, nearly twice that of the state as a whole; production of natural gas rose 100 per cent, also nearly twice the rate of growth for the state. Progress in the San Juan becomes even more impressive when 1948 figures are examined. That year the Basin produced only 9 million MCFs of gas. The 195 million output in 1956, therefore, represented a whopping increase of more than 2,000 per cent!

Where in the Basin do the gas and oil come from? Which counties are major producers? Which pools are apparently the richest? Major sources of gas are presented in Figure 1 and Section A of Table V. Major sources of oil are shown in Section B of Table V. San Juan county is the area's outstanding producer of both. Only one other county, Rio Arriba, so far yields gas; however, all Basin counties produce some oil,

TABLE I
PRODUCTION OF CRUDE OIL, DISTILLATE, NATURAL GAS, AND CASINGHEAD GAS
SAN JUAN BASIN AND NEW MEXICO, 1953-1956
(oil and distillate in 1,000 of barrels; gas in 1,000 of MCFs)

	1956	1955	1954	1953
SAN JUAN BASIN				
Crude Oil	1,080	623	652	696
Distillate	393	392	348	148
NEW MEXICO				
Crude Oil	87,262	81,280	74,525	70,491
Distillate	1,391	1,270	1,003	916
SAN JUAN BASIN				
Natural Gas	193,445	167,578	146,728	97,559
Casinghead Gas	1,815	494	19	41
Total Gas	195,260	168,072	146,747	97,600
NEW MEXICO				
Natural Gas	391,700	316,787	276,545	98,492
Casinghead Gas	233,945	216,580	211,054	306,490
Total Gas	625,645	533,367	487,599	404,982

Barrels contain 42 gallons
MCFs contain 1,000 cubic feet
Source: New Mexico Oil Conservation Commission

although San Juan supplies more than half. Within that county the Blanco pool in the Mesaverde formation produces two thirds of the area's gas, but no single oil pool dominates the picture in like fashion. Relative positions of various geologic formations and the levels at which gas and oil are being produced are shown in Table VI. Levels indicate the ages of formations rather than their depths, which vary considerably.

II. Development in the San Juan

Early Discoveries

The sequence of development of oil and gas potentials in northwestern New Mexico is important to an understanding of progress there. As early as 1882 men knew there was oil in the San Juan. The U.S. Geological Survey that year reported that the New Mexico Bitumen and Oil company had done some prospecting in April about six miles east of the Navajo Reservation "in the extreme western portion of New Mexico," where it "discovered a flowing oil spring; but the workmen were driven away by Navajoes before they could determine the quantity of oil obtainable." The USGS asserted that "the quality of the petroleum is excellent and the value of the strike will very shortly be fully investigated." Other signs of oil were found in McKinley county in 1884 and 1890, and some drilling was done near Gallup in 1901. In 1903 New Mexico's territorial governor, Miguel Otero, included in his annual report a statement that he believed San Juan county to be the center of a vast oil basin. The coming of railroads would, he felt, put San Juan in line as an oil producer. Despite all these signs and portents, the initial oil discovery in the area is usually considered to be that made in 1911 (by a man digging for water) in the Seven Lakes area of McKinley.

The Seven Lakes production, what little there was of it, came from a well 300 to 400 feet deep, surely one of the shallowest discoveries of all Basin wells. (One San Juan well sunk in 1955 went down 13,590 feet.) Only a few barrels of oil resulted, and every subsequent "wildcat" (a well a mile or more from any proven pool) within that particular region for years was unsuccessful. Recently, however, several old holes

TABLE II
PRODUCTION OF NATURAL GAS LIQUIDS
SAN JUAN BASIN AND NEW MEXICO, 1953-1956
(1,000 of barrels)

	1956		1953	
SAN JUAN BASIN				
Total Liquids	2,789		692	
Natural Gasoline		1,100		311
Butane		887		216
Propane		802		165
NEW MEXICO				
Total Liquids	14,089		7,782	
Natural Gasoline		6,980		4,572
Butane		3,922		1,937
Propane		3,187		1,273

Source: New Mexico Oil Conservation Commission

have been reworked, with a small commercial flow reported from one location. No new oil discovery was made until 1922.

Nine years after that first oil discovery the area's first gas well blew in, a mile south of Aztec. The state's first pipeline took this gas into town. The discovery well, with an initial flow of 3,000 MCFs per day, supplied Aztec during most of the 1920s.

Ute Dome (gas, 1921 and 1922). A year later, 1921, gas was discovered at Ute Dome with completion of a well producing 4,000 MCFs daily. The next year Ute Dome had a second well, this one with a flow nearly nine times that of the discovery strike. But there were no accessible markets; so Ute Dome's gas remained untapped until 1929, when a 32-mile pipeline was laid to Durango, Colorado. Meanwhile the production potential of the two wells did much to encourage further exploration.

Hogback (oil, 1922). The first really important Basin oil discovery came in 1922 at Hogback 10 miles southeast of Shiprock. This well, also, was shut in--but only for two years--by the absence of transport facilities to a market. In 1924 a 20-mile pipeline went to Farmington, from which point the oil was moved by rail to Salt Lake City until the Continental Oil Company completed its refinery in Farmington the next year.

Hogback was to prove lucrative. Thirty years later, in 1952, a new well was to go much deeper, down about 7,000 feet into the Pennsylvania formation, and bring in 8,700 barrels of oil and 461,200 MCFs of gas. The same year eight other wells, probably sunk earlier, were to bring in 85,300 barrels of oil from the original (Dakota) formation.

Bloomfield and Rattlesnake (oil, 1924). The third and fourth San Juan oil discoveries were 1924 strikes: one at 700 and 1,700 feet in the Farmington formation just north of Bloomfield; the other at 825 feet in the Dakota at Rattlesnake seven miles southeast of Shiprock. The Bloomfield discovery flowed only five barrels of oil per day; the Rattlesnake flowed 10. More than 25 oil wells drilled in the Bloomfield area failed to be money-makers. Shortly after World War II some gas was produced, but reports indicate no activity during the last five years. The Rattlesnake record, however, is somewhat brighter. A number of wells were put down into the Dakota there, and in 1929 one at 6,800 feet in the Hermosa flowed 650 barrels of oil per day for about three years. A second deep well produced commercially and was worked until 1940. The shallow Dakota continues to produce. During 1956 it yielded, from some 26 wells in the area, 14,800 barrels of oil and 21,800 MCFs of gas. This pool is owned by Continental Oil Company, which formerly refined the oil--as well as that from the Hogback--at Farmington. Now, however, El Paso Natural Gas Products is purchasing production of both pools.

TABLE III
VALUE OF SAN JUAN PRODUCTION
OIL AND NATURAL GAS

TABLE III
VALUE OF SAN JUAN PRODUCTION
OIL AND NATURAL GAS, 1953-1956
(in thousands)

	1956	1955	1954	1953
Crude Oil[1]	$ 4,006	$ 2,761	$ 2,690	$2,177
Natural Gas[2]	14,644	12,605	10,272	3,904
Total	18,650	15,366	12,962	6,081

[1]Includes Distillate

[2]Includes Casinghead gas

Source: Estimated from reports of the New Mexico Oil Conservation Commission. These figures may not agree with reports from other official sources.

TABLE IV
PRICES OF CRUDE OIL AND NATURAL GAS
NEW MEXICO
1951, 1954, 1956

	1956	1954	1951
Crude Oil (per barrel)	$2.740	$2.750	$2.450
Natural Gas (per MCF)	.089	.078	.038

Source: U. S. Bureau of Mines. These figures may not agree with reports from other official sources.

Table Mesa (oil, 1925). Thirteen miles south of Shiprock, Table Mesa had its oil first tapped in 1925. The discovery well flowed 325 barrels per day and is still producing, its eight wells--wholly owned by Continental Oil--having yielded 10,400 barrels during 1956. This production also originally went to Continental's Farmington refinery.

Hospah (oil, 1926). McKinley county got its second oil discovery in 1926, an eight-barrel-a-day well at Hospah 60 miles northeast of Gallup. Hospah was long one of the rich oil fields of the Basin, its 44 wells producing 132,400 barrels in 1956.

Blanco (gas, 1926). The Basin's most important discovery well blew in the same year as the Hospah. This one, however, produced gas and was located five miles north of Blanco. An exceedingly rich natural gas pool was subsequently proven. In 1948 it covered 12,000 acres; today, the Blanco Mesaverde is the Basin's largest, extending throughout some 780,000 acres in San Juan and Rio Arriba counties. In 1953 production totaled 62.2 million MCFs from 546 wells. In 1956 output came to 131 million from 1,131 wells. The Blanco pool has also produced distillate in significant volume, reaching 357,900 barrels in 1956. Constant drilling has proven new acreage and has transferred to the Blanco name several pools once considered independent.

Development was slow, however. In 1949, according to the New Mexico Bureau of Mines, only one well was in production; and total cumulative yield from discovery in 1926 through 1949 was 699,600 MCFs, only a fraction of last year's

output. General growth of the Southwest and construction of pipelines to the West Coast had to come before development of the Blanco really got going.

For many years the only purchasers of Blanco gas were El Paso Natural Gas and Southern Union Gas. Now, however, following completion of the pipeline to the Northwest Coast, Pacific Northwest Pipeline Corporation has entered the market.

Kutz (gas, 1927). The Fulcher-Kutz pool, third most productive in San Juan county, fourth in the Basin in 1956, and first to gain a substantial market, was discovered in 1927 in Kutz canyon. Continued exploration brought in the Fulcher field in 1934. After World War II, discoveries were made in four different formations ranging from 1,300 to 6,800 feet in depth. Last year 321 wells brought in 7.6 million MCFs plus a small amount of distillate.

Stoney Butte (oil, 1928). Another Mesaverde oil pool was the Stoney Butte, discovered in 1928 just north of the McKinley county border in central San Juan county. Apparently, no commercial development took place then; but in 1950 the area was re-entered, with one new operator soon reporting a commercial flow of 40 barrels per day. Six wells were then sunk, and production was maintained until mid-1952. Reports of the New Mexico Oil Conservation Commission indicate no activity since then.

Also in 1928--17 years after the first such discovery in the San Juan--a producing oil well came through near Hobbs in Lea county in southeastern New Mexico, opening the Permian Basin, which was to surge to the forefront in the state's economy and overshadow operations in the northwestern part of the state. Although the Permian produces large quantities of gas, it is as an oil region that it contributes most.

Red Mountain (oil, 1934). Back in the San Juan, in 1934 a shallow well at Red Mountain in McKinley county, 65 miles northwest of Gallup, produced five barrels of oil a day. Although there have been 12 wells in the pool, apparently production has never topped 4,000 barrels a year. Red Mountain's cumulative production--through early 1955 when all activity ceased--was about 20,000 barrels. That oil was trucked to Hospah and then piped to Prewitt.

Barker Creek (gas, 1942). San Juan activity was spotty between 1934 and 1941; then the high priority on tools brought on by the war greatly restricted drilling. Nonetheless, a very important gas discovery occurred in 1942 at Barker Creek approximately 15 miles north and slightly west of Farmington. Gas had been detected at Barker Creek as early as 1925 by a wildcat well; but since gas was at that time considered of no real value, the well had been plugged and abandoned. The 1942 discovery had an initial flow of 15,000 MCFs of gas per day.

Post-War

The current period of development in northwest New Mexico was ushered in by the ending of World War II. Geologists with faith in the area again found tools available and began fresh activity.

Barker Creek (gas, 1945). The first milestone along the new road to genuine development of the area was the 1945 drilling of another well at Barker Creek, this one going down 8,600 feet to the Paradox formation, words soon to ring with magic in the ears of oil and gas men everywhere. The Barker Creek pool still produces, its yield from the nine Paradox wells (6.6 million MCFs in 1956) marking it as one of the six or eight top pools in the entire Basin. Fourteen other Barker Creek wells sent up 474,600 MCFs the same year.

Angels Peak (gas, 1947). From this point on, San Juan activity became almost feverish. Discovery after discovery was made, and old pools were drilled more deeply. In 1947 came the discovery of Angels Peak pool about 10 miles south of Bloomfield. Three wells there produced 207,000 MCFs in 1956, all going to Southern Union, and 5,280 barrels of distillate. In 1948 the Ute Dome pool was drilled deeper.

TABLE V
NATURAL GAS AND CRUDE OIL PRODUCTION
BY COUNTY AND MAJOR POOL
SAN JUAN BASIN, 1956
(gas in 1,000 MCFs; oil in 1,000 of barrels)

SECTION A

Natural Gas Production

Basin Total	193,445		
San Juan County		175,652	
Blanco Mesaverde[1]			131,779
Ballard Picture Cliff			12,151
Fulcher Kutz Picture Cliff			7,608
Aztec Picture Cliff			7,541
West Kutz Picture Cliff			7,051
Barker Creek Paradox			6,606
Other Pools			2,916
Rio Arriba County		17,793	
South Blanco Picture Cliff			10,651
Otero Picture Cliff			1,360
Tapacito Picture Cliff			1,329
Canyon Largo			1,113
Other Pools			3,340

[1] Partly in Rio Arriba County

SECTION B

Crude Oil Production

Basin Total	1,080		
San Juan County		624	
Bisti Gallup			325
Hogback Dakota			84
Undesignated Tocito			168
Other Pools			47
Rio Arriba County		308	
South Blanco Tocito			280
Otero Graneros			25
Other Pools			3
McKinley County		132	
Hospah			132
Sandoval County		16	
Undesignated Mancos			13
Otero Sanostee			3

Source: New Mexico Oil Conservation Commission

Lindrith (oil, 1949); La Plata and Largo (gas, 1949). During 1949 a small oil discovery at Lindrith in southern Rio Arriba county brought initial production of 68 barrels per day, and two discoveries at La Plata and Largo resulted in a reappraisal of the Blanco pool and their incorporation into it. In the Lindrith area several wells were sunk after the discovery, but apparently only one has produced during the last five years. A recent Largo well opened up a new pool, which last year yielded 22,500 MCFs.

South Blanco Tocito (oil, 1951). A truly significant oil discovery, flowing 404 barrels per day, occurred in Rio Arriba 27 miles southeast of Blanco in the Mancos (Tocito) formation in 1951. Subsequent development uncovered a productive area soon known as the South Blanco Tocito pool, which, until last year, was the top oil producer in the San Juan Basin. Its 16 wells filled 280,300 barrels in 1956.

During the first years, a small amount of casinghead gas ("wet" gas from an oil well) was also produced in the South Blanco Tocito. Operations there are largely controlled by Lowry, et al, owners of 13 of the 16 wells.

Although the Oil Conservation Commission designated only one new 1951-52 pool, the period was one of continual activity. Many small pools were discovered, and most major producing areas underwent much development.

1953-56

Media Entrada and Torreon (oil, 1953). In 1953 two small oil fields were found about eight miles apart some 30 miles east of Hospah in Sandoval county. They were named the Media Entrada and the Torreon Mesaverde. Each had only one or two producing wells. The Oil Commission reports that Torreon produced for only part of one year and Media for only three years. Current reports indicate that the former has been abandoned and that the Media has been shut in, presumably because transportation and/or markets are lacking.

Huerfano Dakota (gas, 1953). Also in 1953, the Huerfano Dakota pool began commercial production, though its discovery probably occurred earlier. Its one well produced 79,800 MCFs of gas and 19,200 barrels of distillate in 1956.

The nature of Basin activity changed somewhat between 1953 and 1956, especially with regard to natural gas. Essentially, it was a time of developmental drilling (a development well is one put down in a designated pool to tap known reserves), although new discoveries at the Basin's southern and eastern edges pushed the boundaries of the productive area farther and farther in those directions and deeper into Rio Arriba county.

During 1953 this county had three designated gas pools, only one of which (South Blanco) produced more than one million MCFs. By the end of 1956

TABLE VI
NATURAL GAS AND CRUDE OIL PRODUCTION
BY GEOLOGICAL FORMATION
SAN JUAN BASIN
January 1957

Formation	Natural Gas (1,000 MCFs)	Crude Oil (1,000 Bbls.)
Farmington	7	
Fruitland	41	
Picture Cliff	7,380	
Mesaverde	19,893	11
Gallup		44
Tocito		35
Dakota	283	11
Paradox	511	
Pennsylvania		2
Total	28,115	103

Source: New Mexico Oil Conservation Commission

Rio Arriba had 11 pools, four producing more than a million MCFs each: Blanco, with 288 wells; Canyon Largo (first developed commercially in 1954), with 22 wells; Otero, with 35 wells; Tapacitos, with 16 wells. Productive wells in the county increased during the same period from 84 to 429.

Otero Graneros (oil and gas, 1954). A pool, at first believed to be an oil producer and not redesignated as a gas pool until 1957, was opened by a discovery in southern Rio Arriba in 1954. Initial tests showed varying amounts of gas, distillate and oil. Named the Otero Graneros, the pool began commercial production late in 1955. A second well in the pool began producing soon thereafter.

Undesignated Pools (oil and gas, 1954). Meanwhile, in San Juan county many relatively minor gas pools were being uncovered during the same 1953-56 period. From 12 designated, named pools with 1,055 wells in 1954, the county gas area in two years grew to 23 designated pools with 2,049 producing wells. Fifteen pools had five or fewer wells and produced only 1.6 million MCFs; the other nine--and a few undesignated ones--produced an amazing 174.4 million.

Although natural gas was the original and continues to be the major product of the San Juan Basin, it is gradually being overtaken by oil. Since 1955 gas activity has been largely developmental, while oil operations have included much wildcatting. The first new indications of oil were uncovered in northern Sandoval county; and, although no definite pool has yet been established, from four to seven wells are producing oil from the Mancos formation at approximately 1,000 barrels per month with slight amounts of casinghead being recovered. The 1956 production from this undesignated Mancos included 2,900 MCFs of gas.

Bisti Gallup and Verde Gallup (oil and gas, 1955 and 1956). During the fall of '55 San Juan county regained the spotlight with important, almost simultaneous discoveries of two new pools. The first included a wildcat drilled by El Paso Natural Gas about 25 miles south of Gallup and

another, probably more significant, completed by the British-American Oil Producing Company March 1956. Both wells were in the same pool later called Bisti Gallup, another name soon to make men's eyes gleam. The second wildcat came through with an estimated initial potential of 3,600 barrels of oil per day, a flow which tremendously increased drilling activity of lease holders thereabouts. The second pool was found by the C. H. Carroll Drilling Company, 15 miles northwest of Farmington, and was named the Verde Gallup.

In 1955-56 drilling moved at a rapid rate, and a large number of new wells were begun. About mid-1956 new Bisti wells began appearing in reports of the Oil Conservation Commission, which reported 11 producers active during June, 59 during September, and 66 by the year's end, despite lack of a readily available market, which caused some slowdown in new starts during the last quarter.

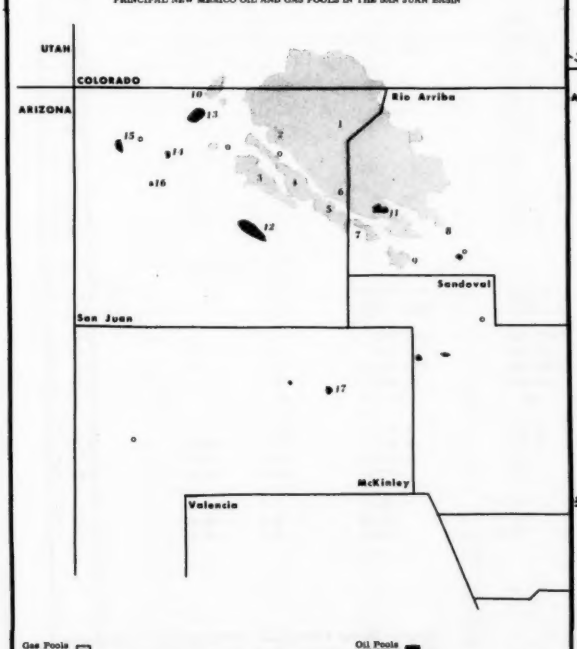
Early 1957 activity was sparked by announcements of a projected refinery and at least one--and perhaps three--pipelines. By mid-1957 the Bisti Gallup pool had 101 producing wells, as reported by the Oil Commission, with a substantial number in the Gallup formation fringing the Bisti area not yet included in that pool. Recoverable oil reserves there are estimated at more than 100 million barrels (worth, at current prices, around $275 million) out of Bisti's estimated total reserves of 300 million barrels. The Bisti pool is fairly tightly held by a few companies, two or three outfits owning approximately 70 per cent of all producing wells.

Bisti daily production varied considerably during the first half of 1957, dropping from a high of 47 barrels per well during March to 17 barrels during May and 19 during June. For three months this year abnormally large shipments to Europe necessitated supplemental oil purchases by Standard Oil of California, despite high rail transportation charges from New Mexico to the Coast. These purchases held daily production to an average of 30 barrels per well. Present production of the Bisti pool is low, but the October 1957 completion of El Paso's Gallup refinery and the 1958 openings of pipelines to oil-hungry California and southeastern New Mexico should push production rapidly upward. Territorial Governor Otero would be gratified with the prospect!

Like the Bisti discovery, the second new San Juan county pool, the Verde Gallup, was in the Gallup zone, but was only half so deep. Drilling

(Continued on Page 10)

FIGURE 1
PRINCIPAL NEW MEXICO OIL AND GAS POOLS IN THE SAN JUAN BASIN



Gas Pools

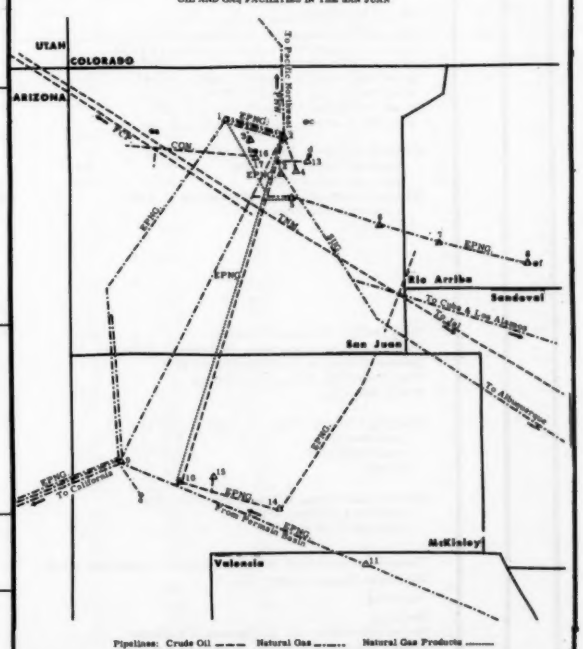
1. Blanco Mesaverde
2. Aztec P. C.
3. W. Kutz P. C.
4. Fulcher-Kutz P. C.
5. Ballard P. C.
6. Sou. Blanco P. C.
7. Canyon Largo P. C.
8. Tapacito P. C.
9. Otero P. C.
10. Barker Creek Paradox

Oil Pools

11. Blanco Tocito
12. Bisti Gallup
13. Verde Gallup
14. Hogback
15. Rattlesnake
16. Table Mesa
17. Hospah

(P. C. - Picture Cliff)

FIGURE 2
OIL AND GAS FACILITIES IN THE SAN JUAN



Pipelines: Crude Oil ——— Natural Gas ——— Natural Gas Products ———

Pipelines		Natural Gas Plants			Oil Refineries	
EPNG	El Paso Natural Gas	1. San Juan River	7. Ballard		13. Bloomfield (EPNG)	
SUG	Southern Union Gas	2. Blanco	8. Lindrith		14. Prewitt (EPNG)	
PNW	Pacific NW Pipeline	3. Kutz	9. Gallup		15. Cinizo (EPNG)	
TNM	Tex.-NMex. Pipeline	4. Angels Peak	10. Wingate		16. Farmington (CON shutdown)	
CON	Continental Oil	5. Chaco	11. Bluewater		17. Farmington (Four-States Western Oil)	
FCP	Four-Corners Pipeline	6. Largo	12. Kutz			
		(1-11, EPNG; 12, SUG)				

Cities and Towns: a. Shiprock b. Farmington c. Aztec d. Bloomfield e. Gallup f. Lindrith

Business Activity in New Mexico

	July 1957	Year Earlier July 1956	Per Cent Change July 1957 from June 1957	Per Cent Change July 1957 from July 1956	INDEX July 1957 (Average Month 1947-49 = 100)
Index of Business Activity (1947-49 = 100)	233.0	219.4	5.1	+ 6.2	233.0
Sales of Retail Stores (1,000's)	$ 97,510	$ 94,934	- 11.6	+ 2.7	198.2
Apparel Stores	2,726	2,578	- 5.7	+ 5.7	137.6
Automotive Dealers	31,570	26,770	- 0.1	+ 17.9	231.6
Subsistence Stores	20,238	20,740	- 10.1	- 2.4	175.5
Furniture and Appliance Stores	3,656	6,153	- 12.9	- 40.6	143.7
Building Materials Dealers	8,823	8,136	+ 6.7	+ 8.4	181.1
Other Retail Stores	30,497	30,557	- 25.4	- 0.2	208.4
Sales of Amusement Establishments (1,000's)	$ 1,497	$ 1,669	+ 16.5	- 10.3	168.1
Sales of Service Establishments (1,000's)	11,140	9,685	- 3.6	+ 15.0	288.1
Sales of Contractors (1,000's)	25,689	25,152	- 1.0	+ 2.1	375.9
Sales of Wholesalers (1,000's)	33,954	30,913	+ 4.7	+ 9.8	168.1
Public Utilities' and Carriers' Sales (1,000's)	11,449	8,731	- 24.6	+ 31.1	244.7
Manufacturers' and Processors' Sales (1,000's)	14,548	16,475	- 20.2	- 11.7	194.0
Life Insurance Sales (1,000's)	20,561	13,912	+ 10.0	+ 47.8	586.3
Bank Debits, 35 banks (1,000's)	$391,144	$359,709	+ 10.0	+ 8.7	246.6[a]
Bank Loans and Discounts, 35 banks (1,000's)	35,931	32,163	+ 6.0	+ 11.7	216.2[a]
Demand Deposits, 35 banks (1,000's)	284,910	292,435	+ 0.4	- 2.6	154.6[a]
Time Deposits, 35 banks (1,000's)	99,936	84,671	+ 7.6	+ 18.0	285.4[a]
Business Failure Liabilities (1,000's)[b]	527	68	+ 88.4	+672.2	1,841.0
Postal Receipts, 37 post offices (1,000's)	574[r]	571[r]	+ 2.6	+ 0.5[r]	241.6[ar]
Number of Workers in Nonagricultural Establishments	205,800	195,500	+ 0.2	+ 5.3	156.2
in Manufacturing	20,400	20,000	- 2.4	+ 2.0	205.7
in Mining	17,600	16,300	+ 2.9	+ 8.0	152.8
in Transportation and Utilities	20,300	20,300	+ 1.5	0.0	135.3
in Trade	45,700	43,400	+ 0.7	+ 5.3	153.8
in Finance, Insurance and Real Estate	7,300	6,700	+ 2.8	+ 9.0	248.7
in Services and Miscellaneous	26,100	23,400	+ 0.8	+ 11.5	121.6
in Government	52,400	49,400	- 1.1	+ 6.1	183.7
in Contract Construction	16,000	16,000	+ 0.8	0.0	126.6
Building Permits, total 15 cities (1,000's)	$ 5,590	$ 5,026	- 4.5	+ 11.2	232.9[a]
Residential	3,952	2,802	+ 9.0	+ 41.1	266.4[a]
Nonresidential	1,066	1,431	+ 8.7	- 25.5	163.5[a]
Other	572	793	- 54.3	- 27.9	215.9[a]
Petroleum Production (1,000's of bbls)	7,627	7,256	+ 2.5	+ 5.1	201.1
Natural Gas Production (millions of cu ft)	55,818	50,850	+ 8.9	+ 9.8	360.8
Electric Power Production (1,000's of kwh's)	241,370	222,334	+ 9.4	+ 8.6	273.5
Index of Total Metallics Production (1947-49 = 100)	105.9	109.5	- 4.3	- 3.4	105.9
Mine Production - Copper (1,000's of lbs)	11,760	12,636	- 5.3	- 6.9	111.2
Mine Production - Lead (1,000's of lbs)	1,200	916	+ 5.3	+ 31.0	115.6
Mine Production - Zinc (1,000's of lbs)	6,120	6,220	- 5.8	- 1.6	95.8
Mine Production - Potash (1,000's of tons)	1,063	939	+ 17.2	+ 13.3	265.6
Index of All Farm Prices (1947-49 = 100)	92.8	79.7	+ 1.5	+ 16.4	92.8
Index of Livestock Prices	93.6	78.9	+ 3.7	+ 18.6	93.6
Index of Crop Prices	98.4	88.1	- 2.8	+ 11.7	98.4
Receipts from All Farm Marketings (1,000's)	$ 6,516	$ 6,535	- 7.3	- 0.3	42.3
Livestock and Products	3,512	3,110	- 30.3	+ 12.9	38.0
Crops	3,004	3,425	+ 50.7	- 12.3	48.6

	August 1957	Year Earlier August 1956	Per Cent Change August 1957 from July 1957	Per Cent Change August 1957 from Aug. 1956	INDEX August 1957 (Average Month 1947-49 = 100)
Bank Debits, 35 banks (1,000's)	$371,749	$363,345	- 5.0	+ 2.3	234.3[a]
Bank Loans and Discounts, 35 banks (1,000's)	31,500	31,704	- 12.3	- 0.6	189.6[a]
Demand Deposits, 35 banks (1,000's)	292,096	288,011	+ 2.5	+ 1.4	158.5[a]
Time Deposits, 35 banks (1,000's)	94,028	84,682	- 5.9	+ 11.0	268.6[a]
Postal Receipts	na	na	na	na	na
Building Permits, total 15 cities (1,000's)	$ 4,710	$ 4,813	- 15.7	- 2.1	196.2[a]
Residential	3,063	2,511	- 22.5	+ 22.0	206.5[a]
Nonresidential	1,137	1,330	+ 6.7	- 14.5	174.4[a]
Other	510	972	- 10.8	- 47.5	192.6[a]
Index of All Farms Prices (1947-49 = 100)	94.8	81.0	+ 2.2	+ 17.0	94.8
Index of Livestock Prices	96.3	81.2	+ 2.9	+ 18.6	96.3
Index of Crop Prices	98.0	87.3	- 0.4	+ 12.3	98.0

[a]Indexes adjusted for changing number of reporting units

[b]Based on three months' data

[r]Revised

Sources:

Retail Sales data: N. M. Bureau of Revenue

Potash Production: N. M. Bureau of Revenue

Petroleum and Natural Gas Production: N. M. Oil Conservation Commission

Life Insurance Sales (New Ordinary): Life Insurance Agency Management Association

Wage Employment (all categories): N. M. Employment Security Commission

Electric Power Production: Federal Power Commission

Metallics Production: U. S. Bureau of Mines

Farm Prices and Marketings: U. S. Agricultural Marketing Service

Bank data (all series), Postal Receipts, Building Permits: Bureau of Business Research

Business Failure Liabilities: Dun & Bradstreet, Inc.

Monthly Summary

(Continued from Page 1)

their sales considerably below the volume a year earlier.

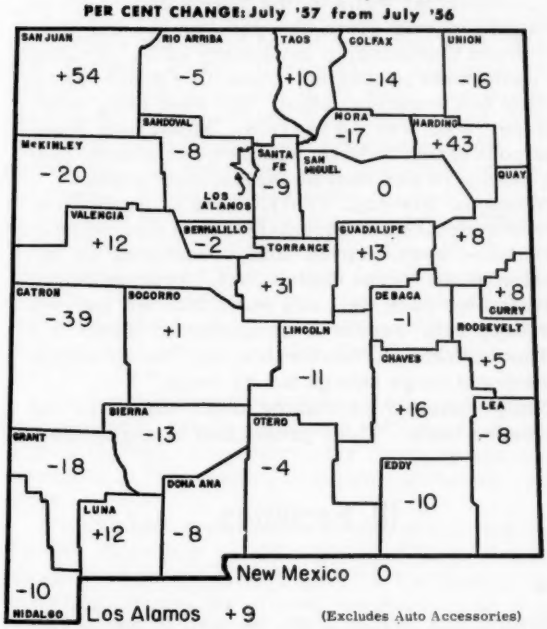
The mining industry showed conflicting trends in July. Production of both copper and zinc continued to fall under the pressure of the unfavorable cost-price relationship. Output of both oil and natural gas continued to expand, despite growing accumulation of petroleum stocks and lowered production allowables. Production of potash, too, showed a healthy gain to push output more than 13 per cent above its July 1956 level.

Although there was a general slackening of business during July, employment increased--an insignificant amount compared with June, but the gain of more than 5 per cent from a year earlier continued the rate of growth typical of the last several years. The yearly gains in services, mining, and finance were particularly strong in July.

Banking activity did not reflect any slackening in business activity in July, but did so in August. On the other hand, building permits, precursors of construction activity, declined during both months.

RETAIL SALES: A Comparison

PER CENT CHANGE: July '57 from July '56



(Excludes Auto Accessories)

Sales Activity in New Mexico Counties

(add 1,000's) — *July 1957*

County	Retail Stores: Apparel	Automotive	Subsistence	Furniture & Appliances	Building Material	Other	Total	Others: Amusement Places	Service Firms	Manufacturers & Processors
Bernalillo	$1,059	$ 9,300	$ 6,070	$1,387	$3,196	$ 7,514	$28,526	$ 313	$ 4,480	$ 2,318
Catron	0	83	36	3	4	51	177	0	1	45
Chaves	175	1,568	1,488	212	676	1,769	5,888	87	568	1,415
Colfax	49	493	250	44	111	495	1,442	25	158	278
Curry	136	1,078	773	109	226	745	3,067	50	372	199
De Baca	(a)	75	68	3	23	146	315	(a)	15	0
Dona Ana	99	1,208	695	148	447	792	3,389	76	337	113
Eddy	181	1,328	1,143	294	439	1,787	5,172	83	553	4,263
Grant	27	457	402	63	76	486	1,511	40	174	57
Guadalupe	5	337	245	1	18	109	715	(a)	14	(a)
Harding	0	92	9	0	1	89	191	1	1	63
Hidalgo	9	166	111	1	72	191	550	8	43	9
Lea	189	2,946	1,125	380	611	3,535	8,786	168	820	1,480
Lincoln	14	208	253	14	101	260	850	54	48	15
Los Alamos	21	227	219	6	15	118	606	14	102	(a)
Luna	41	394	279	49	49	268	1,080	12	90	307
McKinley	76	831	577	87	160	758	2,489	58	224	565
Mora	3	92	27	0	3	59	184	2	2	12
Otero	100	965	722	156	292	513	2,748	36	247	201
Quay	34	571	374	45	102	325	1,451	20	89	17
Rio Arriba	12	550	277	22	98	298	1,257	3	64	88
Roosevelt	27	463	312	54	114	324	1,294	17	111	56
Sandoval	(a)	192	152	0	6	136	486	0	12	0
San Juan	111	2,475	855	127	875	3,028	7,471	106	548	1,169
San Miguel	11	357	353	50	83	391	1,245	40	96	81
Santa Fe	239	1,237	1,218	138	387	1,246	4,465	84	732	242
Sierra	2	142	108	19	37	103	411	13	37	26
Socorro	8	281	198	29	42	121	679	0	28	15
Taos	11	326	324	58	29	261	1,009	14	57	17
Torrance	(a)	213	142	9	12	308	684	1	11	0
Union	15	223	95	8	52	148	541	7	42	4
Valencia	28	928	489	51	146	627	2,269	21	98	70
Unallocated	44	1,764	849	89	320	3,496	6,562	144	966	1,423
Total	$2,726	$31,570	$20,238	$3,656	$8,823	$30,497	$97,510	$1,497	$11,140	$14,548

(a) Less than $1,000

Source: School Tax Division, N. M. Bureau of Revenue

(Continued from Page 7)
there continued throughout 1956 and resulted in 12 commercial wells by the year's end. Official recognition was given the pool by the Oil Conservation Commission in January 1957. By June 43 wells were producing. Also like Bisti, Verde Gallup has varied in output. The June daily average per well was 18 barrels. Again like Bisti, this pool is tightly held, with two companies owning nearly 70 per cent of commercial wells.

Mountain Ute (oil, 1957). Late in September, Pubco Petroleum's Mountain Ute wells--nine at the time--were proven and considered an extension of the Verde Gallup pool. Average initial potential for each well was more than 500 barrels per day, with reserves estimated at above 3.3 million barrels of recoverable oil. The extension is believed large enough for 32 wells.

Many pools of secondary importance are not discussed here. Their production is negligible.

III. Facilities

Gas

Natural gas comes from the well in one of two forms: dry gas, containing few impurities and requiring only slight processing to be usable, and wet gas, which comes from both gas and oil wells. If from the former, wet gas contains varying amounts of liquids (condensates) and impurities--sulphur, nitrogen, and carbon dioxide, all of which must be removed before the gas is usable. If it comes from an oil well, wet gas is called "casinghead" gas and is strictly a by-product, which is separated from the oil and then used like dry gas.

What, then, is needed for transporting and processing natural gas? The answer depends upon location and upon type of gas. Usually, gas goes from the well through a pipeline gathering system to a field compression station, which moves it along to a processing plant for dehydrating, purifying (wet gas must also have all natural gas liquids removed), and transporting--under a maximum pressure of 830 pounds--in another pipeline to market. Compression stations must be built anywhere from 35 to 100 miles apart along the entire length of a pipeline to maintain pressure and keep the gas moving. At maximum pressure natural gas travels about 18 miles an hour.

The liquids removed from wet gas go to a fractionating plant for separation into natural gasoline, propane, butane, and possibly some lighter hydrocarbons, all variously useful both within the industry and to customers generally. (See "Natural Gas Liquids," Napier, New Mexico, Business, April 1956.)

Oil

What about oil? It, also, is largely transported by pipeline. All necessary processing takes place at a single refinery, either a catalytic plant which breaks down the crude petroleum into numerous components--among them, motor fuel, fuel and lubricating oils, kerosene, grease, ashpalt, wax, coke, etc.--or a skimming plant (often called a "topping" plant) which removes the gasoline and kerosene from crude and then markets the residue as fuel oil.

Gathering systems, absorption and fractionating units, refineries, major pipelines, purifiers, dehydrators, compression stations--a whole complex of necessary facilities. How well is the San Juan Basin supplied? In this regard, things are looking up (see Figure 2). The Basin has 17 plants, ranging from simple field compression stations for natural gas to complex oil refineries, and somewhat more than 1,000 miles of pipelines. The El Paso Natural Gas Company and its subsidiary companies, El Paso Natural Gas Products Company and Pacific Northwest Pipeline Corporation, control the vast majority of these facilities. Southern Union Gas Company is second in importance in the area.

Early San Juan Installations

The first New Mexico pipeline was built in 1922 to carry gas from the state's first well to Aztec. Seven years later two more lines were laid--one from the Ute Dome pool to Durango, Colorado, and one laid by Southern Union from Kutz Canyon to Farmington. The state's first major line was another Southern Union project, this one built in 1930 to pipe gas southeast from Kutz Canyon to Albuquerque and then north to Santa Fe. It was extended to Belen in 1940 and to Cuba and Los Alamos in 1949.

During this pre-war period only one line, built in 1924, carried oil. Serving the Hogback and Rattlesnake pools, it ran to Continental Oil's refinery in Farmington, completed in 1925. Two smaller refineries went up the same year at Bloomfield and Aztec. All three were skimming plants. That at Aztec operated 12 years; that at Farmington was declared obsolete only this year; that at Bloomfield will close when a new refinery under construction at Ciniza is in operation.

An oil refinery was put up by Petroleum Products Refining and Producing Company in 1940 at Prewitt. Possessing both skimming and cracking facilities and a daily capacity of 4,000 barrels, it is still in operation but will give way to the Ciniza refinery. The Bloomfield and Prewitt plants have changed hands twice since 1950. First, they were bought by Malco Refineries, for a few years the most important purchaser of

Basin crude and liquids; then early in 1956 they were acquired by El Paso.

Recent El Paso Programs

In 1949 Southern Union began running its Kutz Canyon Natural Gasoline plant, first modern gasoline absorption plant in the Basin. Gas from Kutz and Barker Creek was processed there.

Probably the most important project in San Juan development was the 24-inch pipeline completed in 1951 by El Paso Natural Gas Company from the Basin to California to deliver gas at the California-Arizona border to a California utility. El Paso's San Juan River Natural Gasoline plant, part of the same overall program, was also finished that year.

One short year later El Paso applied to the Federal Power Commission for permission to build a 30-inch line from the Permian Basin in west Texas diagonally across the state to a point just west of Gallup, where it would connect with the San Juan-California line, and from which point it would parallel the original line westward to California. From the Gallup junction a 30-inch loop would run north for 65 miles and increase carrying capacity from the San Juan. These projects went into use in '54.

By the end of the same year the company had either in operation or under construction in the Basin several processing plants and compressor stations. The San Juan River plant, completed in '51, was the first major El Paso plant in the region. It both treated and compressed gas designed for California. At first, the separated liquids were apparently sold in the Basin. Later, they were fractionated at a plant completed at Wingate in 1953. Resulting products were shipped to market by tank car or truck.

Within the year a plant went into operation at Blanco, and compression stations were finished at Kutz, Angels Peak, and Gallup, the first two to push area gas along to the big plant for further processing, the last to maintain pressure along the line heading west. The Blanco plant processed and compressed gas, which then went by pipeline to the San Juan plant and thence to California. The compression stations were joined in 1954 by one at Bluewater and another at Lincoln along the line from the Permian Basin to the San Juan pipes.

In 1954 Pacific Northwest Pipeline Corporation, which had major gas purchasing contracts in northern Canada, the San Juan Basin, and smaller fields adjacent to its right-of-way, began a 1,500-mile pipeline, putting it into operation late in 1956. The line primarily serves the major cities in Washington and Oregon plus smaller communities along its route. Shortly after the line was opened, El Paso announced its intention of buying control of Pacific Northwest; and in January of this year transactions were completed, bearing out rumors which had been circulating ever since the Federal Power Commission approved the project. Control passed to El Paso, but Pacific Northwest still operates the pipeline and other facilities, maintaining its corporate name and personnel. El Paso felt that control of Pacific Northwest would substantially improve El Paso service to its customers and enable it to utilize more efficiently gas reserves in Canada, the San Juan and Permian Basins, and certain pools along Pacific Northwest's route. Certainly, El Paso now has tight hold on all major natural gas reserves and markets from the Rockies to the Pacific Coast.

The Four States Western Oil Refining Company put up a new, small skimming refinery at Farmington in 1955. Since then, this company has sold products in New Mexico, Arizona, Colorado, and Utah.

A tremendous expansion program was started by El Paso late in '55. Included were a third pipeline from the Blanco plant to California, the doubling of capacity of both the Blanco and Wingate plants, a second 8-inch products pipeline between the two plants, a short 24-inch line between Blanco and the Pacific Northwest plant at Ignacio, Colorado, and compression stations at Belen and Caprock on the Permian-San Juan line. All projects were finished this year.

Also in '55, El Paso established a subsidiary products company as a move toward full integration of El Paso operations. Among the first actions of the new organization in the Basin was acquisition of the Bloomfield and Prewitt refineries with plans for immediate expansion of both.

Simultaneous with its organization of the subsidiary, El Paso discovered the Bisti Gallup oil pool, with significant amounts of crude proven by the spring of '56. The products company moved at once to take advantage of the new situation. It announced plans for a major oil refinery at Ciniza with initial capacity of 6,500 barrels a day and a possible expansion to 13,000, some 10 miles east of Gallup; conversion of the 6-inch products line from Blanco to Wingate to carry oil; a new pipeline from the Bloomfield refinery to the converted products line; an additional 4-inch line from Wingate through Ciniza to Prewitt; and an extension gathering system to bring Basin oil to Ciniza.

While these plans were being worked out, processing facilities at Bloomfield and Prewitt were expanded, and new storage terminals for crude were built at Bloomfield and Wingate. The opening of the Ciniza refinery will round out El Paso operations in the Basin, so that--even after closing the Bloomfield and Prewitt plants--the company can process all materials in the Basin.

Furthermore, the new installation will provide a major outlet for natural gas liquids products. No storage facilities will be supplanted by the new refinery.

At the same time that its San Juan oil activities were increasing by leaps and bounds, El Paso had to provide more natural gas for its customers. During 1956 the company announced plans for two new compressors for the Permian-San Juan line, a new line to loop the Permian-San Juan pipe for a considerable part of its length, and a new plant (including dehydration, gasoline absorption, and compression units) at Chaco 20 miles southeast of Farmington to receive wet gas from the South Blanco field and other pools to the east. Construction was to aim at late-1957 completion. Liquids removed from the gas would be piped to Wingate for fractionating; the gas would move to market through the Blanco-to-California line, with the Blanco and Gallup compression stations being enlarged to handle the increased flow.

Additional plans include three new compressing and dehydrating stations--at Lindrith, Largo, and Ballard--to supply Chaco with gas and to facilitate the marketing of gas from the east portion of the Basin, where reserves have recently been substantially increased. A 60-mile pipeline will connect these stations.

Expansion Plans of Other Companies

El Paso is not unique in the matter of extensive expansion, especially in oil. Other companies have also been busy. Two other pipelines are under construction--that of the Four Corners Pipe Line Company (six major oil operators with California interests), running from the Four Corners country toward Los Angeles refineries, and that of the Texas-New Mexico Pipeline Company (four major oil companies), being laid from the Aneth area in southeast Utah through producing sections in northern New Mexico across the state to Jal. The first line will have a daily capacity of from 60,000 to 70,000 barrels, which could probably be increased by additional pumping stations to 170,000. A branch from the Bisti field will join the main line northwest of the Four Corners. The second project reportedly will have a daily capacity of 50,000 barrels. Both are to be completed fairly early in 1958. Although these lines are aimed primarily at pools in the Aneth area, New Mexico reserves are important to both, and the market available to New Mexico producers through the lines is sure to spark additional oil activity. With completion of the lines and of El Paso's Ciniza refinery, approximately 130,000 barrels of oil per day will become accessible to markets. By mid-1958, Four Corners oil production should be moving at jet-age speed.

Another pipeline had been planned--that of a subsidiary of the Pacific Northwest--from the Four Corners to Salt Lake City. But, according to recent word from a company official, no progress has been made beyond the planning stage.

IV. Importance of Oil and Gas to the San Juan

Much has been said and implied here regarding the general importance of all this activity. What about its impact upon the Basin itself?

Many yardsticks--but none capable of measuring precisely--can be applied to the effects of San Juan's oil and gas industry upon the region in which it originates and is carried on: population, employment and wages, secondary industries fostered and in part supported, influence upon other major industries, and the like. Measuring the impact of gas and oil is considerably complicated by the fact that the Basin is also enjoying rapid development of its vast uranium reserves, which promise to become even more stimulating than gas and oil.

TABLE VII
EMPLOYMENT AND WAGES IN THE SAN JUAN BASIN
1951, 1954, 1956

	Employment		Wages	
	All Industries	Oil and Gas	All Industries	Oil and Gas
1956	11,622	1,557	$45,821,000	$8,073,000
1954	8,906	818	30,437,000	3,993,000
1951	6,798	423	19,871,000	2,502,000

Source: New Mexico Employment Security Commission

Population

Population in the San Juan Basin has begun to climb sturdily. In 1951 all inhabitants of Rio Arriba, McKinley, Sandoval, and San Juan counties totaled an estimated 85,400. (All intercensal figures are estimates.) Last year there were about 115,300 persons living in the Basin, 35 per cent more than in '51. Recent projections indicate a Basin population in 1965 of 153,800 people. Significantly, the greatest growth is taking place in McKinley and San Juan, the former growing from some 27,800 in 1951 to around 35,300 in 1956, and the latter apparently doubling during the same time, increasing from 21,400 to 42,800.

Employment and Wages

Table VII presents figures pertinent to employment and wages in the area. The proportions of San Juan labor force and wages contributed by oil and gas are steadily rising. In 1951, 6,789 persons were employed in the Basin, only 6.2 per cent of them working in oil and gas. Last year's percentage was 13.4--1,557 out of the total of 11,622. All Basin wages in 1951 came to $19.8 million, of which 12.6 per cent came from oil and gas. Total 1956 wages amounted to $45.8 million, with oil and gas workers drawing 17.6 per cent: 1,557 industry workers (16 per cent of the state's total in the industry compared with only 8.5 per cent in 1951) received $8,073,000 in wages.

Business in General

Retail sales, important in evaluating activities at least partly called into being and partly supported by oil and gas, are also showing healthy growth. Total retail sales in the four counties in 1950 came to $48.9 million. Last year they reached $107.2 million, a rate of expansion greater than that of Basin population. Again, most impressive gains were made by McKinley and San Juan: $18.5 million in McKinley in 1950 and $30 million in 1956; $11.5 million in San Juan in 1950 and $59.6 million last year.

Production

In the matter of production, oil and gas far outrun both agriculture combined with all other extractive industries thereabouts. Agricultural products sold in 1954, for example, brought $6.9 million; oil and gas brought $13 million. Other mineral products (as reported by the State Mine Inspector) in fiscal 1955 were worth $3.3 million compared with $15.4 million for gas and oil; in fiscal 1956 other mineral production was valued at $3.6 million, while oil and gas products were worth $19 million.

While gas and oil presently dominate the minerals production in the Basin, the development of its vast uranium deposits conceivably could, during the next few years, relegate gas and oil to secondary importance in the growth of the area.

Taxes and Fees

San Juan oil and gas contribute through taxes a not inconsiderable income to state and local governments. The industry also pays out in rents, royalties, and bonuses sizeable amounts to landlords, whether local or state or federal governments, private organizations, or individuals (a great portion of the leased land in the Four Corners country belongs to state and federal governments and Indians). Of the $19 million in San Juan oil and gas production in 1956 approximately 5 per cent, about $1 million, went into taxes and fees.

TABLE VIII
ESTIMATED TAX COLLECTIONS FROM OIL AND GAS
SAN JUAN BASIN, 1955

Severance Tax	$ 487,000	
School Tax	335,000	
Property Tax	290,000	
Oil Conservation Tax	25,000	
Total	1,137,000	
San Juan		$953,000
Rio Arriba		169,000
McKinley		14,000
Sandoval		1,000

Source: Bureau of Business Research, estimated from information supplied by state agencies.

All operators pay four basic taxes: severance and oil conservation taxes, levied at 2 1/2 per cent and .0014 per cent respectively on the market value of the raw product less royalties; the property tax, levied--at rates which depend upon localities--on one half the market value of the raw product after royalties have been deducted; and the school tax, levied on the sales value of products resulting from the processing of raw materials--2 per cent on those processed outside the state and 1/2 per cent on those processed within New Mexico. Severance-tax payments go into the state's general fund. Conservation-tax payments finance the work of the State Oil Conservation Commission. Property-tax receipts are divided among state, county, school district, and sometimes municipality in proportion to the relation of their individual rates to the total rate. The school tax helps finance the public schools.

Since the state owns almost 4 per cent of the land in the Basin, we can safely assume that a fair proportion of the state's annual income in rents, royalties, and bonuses, comes from the San Juan.

In such fashion has the story of oil and gas in New Mexico's San Juan Basin unfolded during the last 45 years. No attempt has been made in this account to be all inclusive, especially in the matter of recent oil activities, that have mushroomed almost beyond counting.

V. Outlook

What, then, of the future in this land of trading posts, of Navajo hogans and Apache wickiups and busy, unattended pumps, of rivers flowing full and white one season and thin and dawdling the next, of 10 signposts on six square feet of mesa pointing to 10 oil and gas locations, of nothing

but jackrabbits and sage and lava flows across as many square--but empty--miles?

Several oil discoveries, notably in San Juan county, appear to possess great potential. Time alone will prove or disprove the validity of appearances. For example, in the spring of 1956 Humble Oil and Refining Company sank a well into the Paradox some four miles southeast of the Four Corners, which tested at 427 barrels of oil a day. Industry publications jubilantly pronounced it one of the most important of all area strikes, suggesting a possible tie-in with large discoveries in southeast Utah. However, a year and a half later no second commercial producer has been found, and drilling in the vicinity has apparently ceased. Of course, the familiar lack of accessible markets plus an industry policy of maintaining huge reserves may be partly responsible for the slowing down of activity.

The Humble case is not an isolated one, but is instead fairly typical of many cases throughout the Basin, though in some locations as many as six wells have been drilled. About 43 wells in the Tocito formation lie roughly along a line which runs diagonally across San Juan county from the Humble strike to three Great Western Drilling Company wells on the southeast boundary of the county. At any time, continued wildcatting could prove new pools in the area.

Table IX shows that drilling in the Basin, both of development and wildcat wells, has increased at a more rapid rate than elsewhere in the state. While the number of wells sunk annually throughout New Mexico increased only threefold between 1950 and 1956, annual drilling in the San Juan was 13 times greater by the end of 1956 than in 1951, with 45 per cent of all state drilling occurring in the northwest. In 1950 one lone oil well was dug; during 1956, 86 were found.

Also impressive is the ratio in the San Juan of dry wells to producing wells, an exceedingly important matter, especially if the well being sunk is a wildcat. Every wildcat, in contrast to a development well put down into known reserves, is a gamble. For the state as a whole, the 1956 ratio of dry wells to producers in proven oil and gas pools was approximately 10 out of every 100; in the San Juan the ratio was only seven out of every 100. In the matter of wildcats, the Basin's ratio of about 80 out of every 100 was somewhat less bright than that of the state generally.

Reserves

When water is continuously scooped out of a barrel, the question soon arises as to how much is left and how long it will last. Much the same question arises regarding the San Juan's natural resources. For example, almost 200 million MCFs of gas were taken from New Mexico's portion in 1956. Immediately, one wonders how much remains in the ground as reserves and how long the known supply will last.

There is no positive answer, but there is a reassuring one. Although production rates are high, the size of known reserves at the end of each year has usually been larger than at its beginning. Constant drilling has indicated oil and gas in amounts greater than those supplying current production. Furthermore, improved methods of extraction enable operators to recover larger proportions of oil and gas than formerly, thereby postponing the tapping of reserves; and oil conservation laws, in effect since 1931, prevent former recklessly wasteful practices.

At the end of 1956 New Mexico possessed an estimated 23.5 billion MCFs (23.5 trillion cubic feet) of known recoverable gas reserves, enough for more than 35 years if the 1956 production rate were maintained, and some 835.4 million barrels in oil reserves. Of course, there will be innumerable new discoveries and constantly improving extraction methods; but presumably there will also be great increases in demand. For example, the El Paso Natural Gas Company during 1956 increased the daily capacity of its entire system by 450,000 MCFs of gas per day, bringing total delivery capacity to three million MCFs per day, practically all of it now com-

TABLE IX
WELLS DRILLED
SAN JUAN BASIN AND NEW MEXICO
1950, 1953, 1956

	1956	1953	1950
DEVELOPMENT WELLS			
San Juan Basin	744	585	52
Oil	72	8	0
Gas	622	548	51
Dry	50	29	1
New Mexico	1,626	1,250	528
Oil	805	547	379
Gas	664	585	82
Dry	157	118	67
WILDCAT WELLS			
San Juan Basin	106	44	14
Oil	14	3	1
Gas	8	13	6
Dry	84	28	7
New Mexico	278	168	79
Oil	56	28	17
Gas	10	15	6
Dry	212	125	56
TOTAL WELLS			
San Juan Basin	850	629	66
New Mexico	1,904	1,418	607

Source: Oil and Gas Journal

TABLE X
NUMBER OF PRODUCING WELLS
SAN JUAN BASIN AND NEW MEXICO
1954-1956 and June 1957

	June 1957	1956	1955	1954
SAN JUAN BASIN	3,129	2,707	2,080	1,651
Oil	287	216	123	1,527
Gas	2,842	2,491	1,957	124
NEW MEXICO	14,140	13,208	11,617	10,250
Oil	10,251	9,736	8,800	8,003
Gas	3,889	3,472	2,817	2,247

Source: New Mexico Oil Conservation Commission

mitted, by long-term contract, to California. However, despite such increases and the pattern they form, it is encouraging to know that at the end of almost every one of the last 10 years New Mexico has had in reserve approximately a 25-year supply of gas and a 10-year supply of oil.

The last detailed estimate of gas reserves made by the state Oil Conservation Commission Dec. 1, 1953, placed more than 90 per cent (15.7 billion MCFs) in the San Juan. State reserves are figured today at around 23.5 billion MCFs, of which the northwestern basin probably holds--at a conservative estimate--70 per cent. San Juan oil in reserve is more difficult to measure. In December 1953 it accounted for approximately 7 per cent of New Mexico's estimated 731 million barrels. How many recent San Juan discoveries were included in the state's estimated total in 1956 (835.4 million barrels) is not known, but in all likelihood the Basin's reserves now form a larger percentage of our untapped oil.

Commitments

The enormous size of gas commitments to out-of-state customers (El Paso's to California is 2.1 million MCFs a day) is cause for much concern and considerable speculation among New Mexicans. What the impact will be upon our manufacturing, construction, transportation, etc., of such wholesale exportation of New Mexico raw materials cannot be foreseen. Few people, however, can claim that the effect is likely to be very exhilarating.

But, whatever the answer to this, and similar questions, the San Juan has arrived. Exploration, development, and production in oil and gas move on apace. The San Juan Basin may still be playing second fiddle to the Permian. But its oil and gas tunes are growing louder and more and more percussive in quality. Many people apparently are plucking the strings at a very fast tempo.

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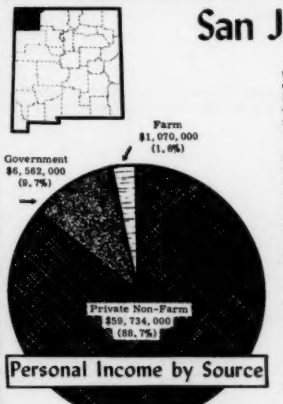


Personal Income by Source

San Juan

The recently developing oil and gas industry of the Four Corners area provides the major share of the income of residents of San Juan county. Like Lea county, almost nine out of every ten dollars of personal income comes from private non-farm sources. (Lea's percentage in 1956 was 88.6; San Juan's, 88.7.)

One major difference between the two areas is the existence of a sizeable Indian population in the San Juan portion of the Navajo Reservation. In 1950 the county had about 8,600 Indians with little or no income, except for wages received from railroad work outside the county. With the entry of the oil, gas, and uranium industries, the income of the Indian population improved; but until the economic status of this group is raised substantially, the county will continue to show a relatively low per capita income.

The county's population increased by 114.8 per cent between 1950 and 1956. Oil and gas jobs were the main attraction, but employment in trade and services also increased. Wage levels rose during the competition for manpower.

The utility and transportation category amounts to 42 per cent of total payments in the wage and salary table shown below. Included in this are the big payrolls of the large-scale natural gas utilities, trucking and warehousing operations required by oil and gas development, communications services, and the wage payments made to railway workers. Actually, the railroads paid the Indians in other areas, but since a large number of these workers live in San Juan, a sum was estimated and attributed to the county. (See New Mexico Business, November 1954, When Indians Come to Town.)

WAGE AND SALARY PAYMENTS BY SOURCE
San Juan County, 1955 & 1956
(in thousands)

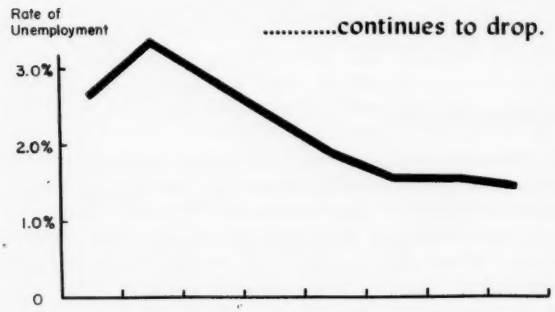
	1955	1956
TOTAL	$37,126	$48,226
Private Industry		
Trade	4,557	6,051
Manufacturing	833	1,514
Utilities	17,115	20,101
Services	1,700	2,556
Construction	2,730	4,868
Finance	458	570
Agriculture	236	240
Mining	5,700	7,775
Government Payments		
Federal	2,040	2,469
State	199	216
County & City	426	532
Public Schools & Colleges	1,124	1,334

ESTIMATED INCOME PAYMENTS TO INDIVIDUALS
San Juan County, 1955 & 1956
(in thousands)

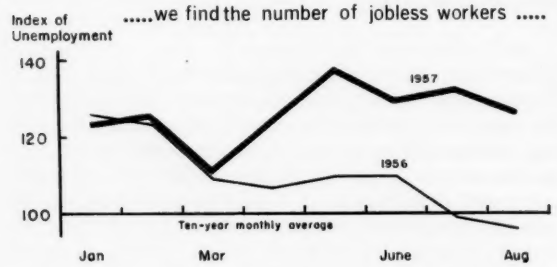
	1955	1956
Wages & Salaries	$37,126	$48,226
Proprietor Income	6,987	10,177
Farm	(753)	(830)
Business & Professional	(6,154)	(9,347)
Property Income	5,151	7,273
Transfer Payments	3,134	3,386
Less: Contributions for Social Insurance	-540	-608
TOTAL	$50,778	$67,366

CHART-OF-THE-MONTH

New Mexico's unemployment .....



But after adjusting for typical seasonal fluctuations.....



.....above normal during 1957's first eight months.

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